STS-110 ORBITER POST LANDING INSPECTION
DEBRIS ASSESSMENT
20 April 2002

After the 12:26 pm local/eastern time landing on 19 April 2002, a post landing inspection of OV-104 Atlantis was conducted at the Kennedy Space Center on SLF runway 33 and in Orbiter Processing Facility bay 2. This inspection was performed to identify debris impact damage and, if possible, debris sources.

The Orbiter TPS sustained a total of 110 hits of which 22 had a major dimension of 1-inch or larger. This total does not include the numerous hits on the base heat shields attributed to SSME vibration/acoustics and exhaust plume recirculation.

The following table lists the STS-110 Orbiter damage hits by area:

	HITS > 1-inch	TOTAL HITS
Lower Surface	18	70
Upper Surface	0	0
Window Area	4	34
Right Side	0	6
Left Side	0	0
Right OMS Pod	0	0
Left OMS Pod	0	0
TOTALS	22	110

The Orbiter lower surface sustained 70 total hits, of which 18 had a major dimension of 1-inch or larger, both numbers are well within family. The area from the nose landing gear to the main landing gear wheel wells sustained 30 hits with 11 greater than 1-inch. Approximately 15 of the total lower surface hits were around the LH2 umbilical area. Most of these damage sites around the ET/ORB umbilical were most likely caused by pieces of the umbilical purge barrier flailing in the airstream and contacting tiles before pulling loose and falling aft.

The largest lower surface tile damage site, located just forward of the RH main landing gear wheel well, measured 3-1/2 inches long by 3/4-inches wide by 5/8-inches deep. The cause of this damage has not been determined yet.

Gap filler material was found protruding from in between tiles on the LH OMS pod eyeball area.

The landing gear tires were in good condition.

ET/Orbiter separation devices EO-1, EO-2, and EO-3 functioned normally. No ordnance fragments were found on the runway beneath the umbilicals. The EO-2 and EO-3 fitting retainer springs appeared to be in nominal configuration. The EO-2/3 pyro debris shutters were fully closed. No other debris was found beneath the umbilicals.

Typical amount of tile damage occurred on the base heat shield. All SSME Dome Heat Shield closeout blankets were in good condition.

There were a total of 34 hits, with 4 having one dimension greater than 1-inch, on the window perimeter tiles. Hazing and streaking of forward-facing Orbiter windows appears to be heavier greater than normal. There is a window ding, 1/4-inch diameter, approximately at the center of window #2.

The post-landing walkdown of Runway 33 was performed immediately after landing. All components of the drag chute were recovered and appeared to have functioned normally.

In summary, the total number of Orbiter TPS debris hits and the number of hits 1-inch or larger were within established family. The potential identification of debris damage sources for mission STS-110 will be based on the laboratory analysis of Orbiter post landing microchemical samples, inspection of the recovered SRB components, film analysis, and aerodynamic debris particle trajectory analysis. The results of these analyses will be documented in the STS-110 Debris/Ice/TPS Assessment and Integrated Photographic Analysis report.

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